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Working Group 6
RTCA DO-242A ADS-B MASPS
Minutes of 7th Meeting held in Washington, D.C.
August 27-30, 2001

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The attendees included:

Tom Foster, Rockwell Collins	Bill Flathers, AOPA	Chris Moody, Mitre/CAASD
Stuart Searight, FAA / ACT-350	Jonathan Hammer, Mitre/CAASD	William Morris, Raytheon
Jerry Anderson, FAA / AIR-130	Gary Livack, FAA / AFS-400	Ken Staub, Trios Assoc.
Rick Cassell, Rannoch	Robert Manning, AF/XOR-GANS	Tom Teeter, Defense Concepts Assoc.
Carl Evers, Rannoch	James Maynard, UPS AT	Tony Warren, Boeing Air Traffic Mgmt.

1. Opening Remarks

    - Tom Foster began the meeting with opening remarks. He welcomed everybody to the meeting and stressed the heavy workload facing WG6 this week. Tom emphasized that deliberations need to focus towards specific MASPS language, since time is becoming critical. Tom also mentioned that the DO-242A schedule will need to be re-evaluated and perhaps some Issue Papers still deemed "Open" for DO-242A might need to be deferred due to lack of resources and time.

2. Review Agenda

    - While the agenda might need to be re-arranged due to meeting participants' availability, the content and general order of the agenda were approved.

3. Review and Approve Minutes of Last Meeting.

    - The minutes from the July WG6 meeting held in Seattle were approved without comment.

4. Integrity and Accuracy Changes (NIC/NAC/SIL) – 242A-WP-7-02, 242A-WP-7-15, 242A-WP-7-16, & 242A-WP-7-17

    - 242A-WP-7-15: This paper detailed analysis on position reporting and NUC_P by ADS-B radar-like services in the Capstone project. Tony Warren thought this paper was an excellent justification for NIC/NAC being incorporated into DO-242A.

    - A discussion on latency for NIC/NAC took place. Among the topics was whether or not a "rapid" update rate should be required for ANY change to NIC or NAC, or only unfavorable changes to these fields. Jim Maynard argued that only detrimental changes should be required to be reported at a high rate due to bandwidth constraints with some of the ADS-B links. Tony Warren argued that it could be beneficial to broadcast improvements in these parameters quickly in order to begin/maintain/re-start a given application. Tom Foster felt we should not stray too far away from the update rate requirements currently found for NUC_P in table 3-4. [AI 7-1] Jonathan Hammer will consider from an operational point of view whether a change in value which improves NIC or NAC needs to be updated at the same rate as the state vector just like a detrimental change does, or if it can be update at the lower update rate of the Mode Status report.

- 242A-WP-7-17: This paper, from Charles Sloane, expresses some concerns about Latency issues for NIC/NAC/SIL. Tony felt that, while the paper raised some good issues, it would be outside of WG6's scope to add the requirement that latency be a required component of all accuracy and integrity messages. Two proposals, therefore, where to change the wording of DO242A's language (including NAC) to reflect that latency is not considered, or to take the point-of-view that ADS-B is a modem which simply transmits the information when available at an acceptable rate. After some discussion, it was agreed that overall latency is and end-to-end issue that needs to be addressed by the ASA MASPS. The current latency specifications in DO-242 (3.3.3.2) were viewed to be sufficient by the group. The latency requirements in 3.3.3.2.2 for NUC_P will be tied to NAC in DO-242A.

- 242A-WP-7-16: This paper is from Pierre Gayraud (THALES Avionics) and documents comments and questions on the WG6 NIC/NAC white paper.

  - Item 2, "Continuity": WG6 agreed this is an end-to-end issue that – like latency – needs to be addressed in the ASA MASPS and not DO-242A.

  - Item 4, "Navigation or Position": Tony proposed placing a note in the NIC/NAC white paper stressing that DO-242A is <u>not</u> an RNP document and that when DO-242A mentions RNP it is meant to only represent the position accuracy of the sensor.

  - Item 5, "Criticality or Severity?": As with the August 6 telecon, it was agreed that since criticality and severity are linked in the text of the white paper and a lot of work is still in front of the principle authors of the white paper, it will be left as is. However, in the MASPS airworthiness terminologies will be used.

  - Items 6 and 7, "Common Failure Causes" and "Common Design Errors"; WG6 agreed that these issues are more global than topics addressed in the ADS-B MASPS. These issues while therefore be forwarded to WG4 for consideration in the ASA MASPS. [AI 7-2] Tom Foster will formally forward this paper to WG4 for consideration in their ASA MASPS work, and will inform Pierre and Jean-Claude Richard of our review and actions of their submitted comments.

- Tony next brought up the topic of Vertical NIC. He felt strongly that the group needs to agree Vertical NIC will be addressed in DO-242A and reflect that position in the White Paper before it is distributed.

- Agreed upon updates for the NIC-NAC White Paper (242A-WP-7-02):

  a. A new column in Table 2 (or new table depending how easy correlation is) will be added to show Vertical Integrity. (How and when to address VPL with Vertical NIC codes 10 & 11 was tabled until Jonathan joins the meeting later in the week.)

  b. Another column will be added to Table 2 for "Vertical Containment" with TBDs in rows 10 &11 for the values. The comment column for rows 10 and 11 will be changed to "HPL/VPL", and bits will be reserved for altitude quality.

  c. The wording describing the SIL categories will be changed from non-essential/essential/critical to airworthiness phraseology of minor/major/severe-major.

  d. For consistency between NAC and NIC, the reserved bits for future expansion for NIC in Table 2 will be removed.

e. Notes for Tables 1 and 2 will be added stating that "RNP" is only meant to reflect the accuracy of the sensor, and does not reflect the navigation inferences associated with RNP in other documents.

5. Intent/TCP Changes {AI 6-6, AI 6-7}– 242A-WP-7-01, 242A-WP-7-03

- Tony Warren gave a presentation on his comments of Richard's first draft of the Intent/TCP White Paper. (242A-WP-7-03)

- It was proposed to scope down the white paper to avoid potential disagreements with the way Intent/TCPs are currently viewed and how they will be addressed in DO-242A. This proposed re-write would have only a few Intent/TCP examples that occur today, and provide a structure possibly with reserved bits or TBDs for some fields that might not be available from current FMS systems today.

- It was agreed that the white paper will categorize TCP types into three general groupings:

    i. Those TCPs types that are well understood and can currently be accommodated in existing aircraft.
    ii. Those TCP types that are future provisioning (top of climb, top of decent, fly-by, radius to fix)
    iii. Future types of TCPs (window- or RNP-based)

6. Re-organization of State Vector and Mode Status Report Elements (IP33) {AI 5-6}

- [AI 7-3] Jim Maynard will update his draft of the MASPS language for re-organization of the SV and MS reports (242A-WP-6-11A) and distribute it to WG6 prior to the September meeting.

7. Requiring "On Condition" reports for all classes

- This item was on the agenda to clarify if there were any action items needed in this area, and to make sure the group was in agreement to not require on-condition reports for all equipage classes.

- This discussion concluded with the realization that Tables 3-3(a) and 3-3(b) will need extensive editing to reflect the Air-reference vector, Trajectory Change Report, and target State Report. [AI 7-7] Based on the update of 242A-WP-6-11A, Jim Maynard will address Section 3.3.2, and Tables 3-3(a)&(b) specifically dealing with equipage classes and required messages those classes are to broadcast.

8. Clarification of "Navigation Center" Requirements (IP14) {6-10}

- This topic was introduced with Ken Staub's proposed definition:

    ➢ ADS-B Navigation Center: A designated point on a aircraft that is used as a reference for reporting own-ship position. ¶ The point should be common to type and located along the longitudinal axis, so that all points of the aircraft are contained within the radius of the smallest circumscribing circle.

- It was agreed that the "smallest circle" needs to have some accuracy/tolerance associated with it.

- It was debated whether the "point" can be 2D, or if it needs to be 3D. It was agreed that DO-242A will only address this point as two-dimensional reflecting the horizontal position components.

- It was agreed to reference the point as a center of a box which contains all of the aircraft's extremities, rather than a circle. This will be consistent with the size characteristic codings, and not infer that a radius must also be broadcast.

- After the group's discussion the definition was changed to read as follows:

  ➢ ADS-B Position Reference Point: A designated point on a aircraft that is used as a reference for reporting the horizontal components of own-ship position. ¶ The point should be common to type and located along the longitudinal axis, so that all extremities of the aircraft are contained within smallest possible rectangle. (i.e. the center of the smallest rectangle that contains all of the aircraft's extremities and oriented along the longitudinal axis)

- It was suggested that the accuracy on this center point will not need to be more than 1 meter, since the LSB of position transmissions on the surface is 2.5 meters.

- It was realized that this will place installment requirements on larger aircraft, and that heading will need to be transmitted to orient the rectangle.

- This ADS-B Center Reference Point will be required when the NAC is 9 or greater.

9. Aircraft Size Characteristics Coding Requirements (IP04) {6-10} – 242A-WP-5-04

- The briefing from the May meeting was reviewed (242A-WP-5-04).

- It was agreed that this coding scheme will be adopted in DO-242A. While it was debated whether we should have a 5th bit for future growth, it was decided that aircraft will be required to broadcast the largest size coding that fits all of its extremities. Doing it in this conservative manner will not adversely effect safety.

- It was agreed to that this information will be broadcast in on-condition messages when an aircraft is on the ground. This led to a discussion of how an aircraft should determine that it is on the ground.

- [AI 7-16] Ken Staub and Bill Flathers will propose language that will define when an aircraft is considered on the ground and when it is airborne and the transitions in-between these states and what needs to be broadcast dependant on these states.

10. Air Reference Velocity Vector (IP37) {AI 6-8, AI 6-9}

- Due to Richard Barhydt's absence from this meeting and the recent priority of addressing Intent/TCP issues no work has been done recently on these action items. This topic was therefore deferred to the September WG6 meeting.

- There was some discussion that this information will be transmitted by on condition reports and Richard's ongoing work for AI 6-8 should include the conditions (if possible) on which these reports will be broadcast. Tony suggested that the air-reference information should be transmitted whenever an aircraft is also broadcasting TCPs.

11. Table 3-4 Changes (IP35 and IP46) {AI 6-17} – 242A-WP-7-05

- Jonathan presented a new Issue Paper (IP46) requesting that Tables 3-3 and 3-4 better reflect the range dependency of requirements rather than application dependency.

    a. To be consistent with IP06, "obstruction" will be changed to "obstacle" in table 3-1

    b. There was concern expressed that the permitted total state vector error was equal to the required maximum error contribution due to ADS-B in the last two columns of Table 3-4. It was proposed that the "Permitted Total State Vector Error" row might just be deleted, and moved to Appendix J with a note referencing this material. This proposal was agreed to be the group and will be adopted in DO-242A.

    c. Note 1 can be deleted since SPS has been turned off, and because the "Permitted Total State Vector Error" row has been moved to Appendix J

    d. It was noted that acceptance of IP46 and it's proposed resolution would nullify the resolution for IP03 requesting receive rates be better suited to operational requirements that was agreed to at the July WG6 meeting. If IP46's resolution is accepted, IP03 will be closed because it is overcome by events.

    e. [AI 7-4] Stuart Searight will inform Steve Heppe of the agreed upon resolution of IP46 and it's impact on closing of IP03.

- Note 7 of Table 3-4 (IP35): It was noted that these requirements are for report reception probability, and does not set requirements for transmission rates. [AI 7-5] Jonathan Hammer will contact Steve Heppe, Stan Jones, and Bill Harman and attempt to resolve IP35 to everyone's satisfaction.

12. Review Surveillance Comments on SC-159 DO-229C WAAS MOPS and DO-253A LAAS MOPS – 242A-WP-7-07 & 242A-WP-7-08

- WG4 of SC-159, which authored the LAAS MOPS joined WG6 briefly on Monday morning to discuss SC-186's non-concur comments on DO-253A.
    - Requested minimum LAAS outputs for ADS-B supporting equipment (when available):
        i. Position (horizontal & vertical)
        ii. Velocity (horizontal & vertical)
        iii. Known latency of position and velocity
        iv. HPL, VPL
        v. HFOM, VFOM
- Tom Teeter reported Tuesday afternoon that the WAAS MOPS reviewed the SC186 non-concur and resolved the comments by not differentiating by WAAS equipage class, but rather by requiring PVT outputs by WAAS equipment that "supports ADS-B." This is consistent with the agreement reached with the LAAS MOPS authors on Monday. Tom Foster stated he felt this met the primary objective of the non-concur.

13. Discussion on Surveillance Issues with SC181 RNP MOPS

- Tom Foster introduced this topic by stating his review of the draft RNP MOPS gave him similar concerns that WG6 had with the LAAS and WAAS MOPS. The apparent problem is that RNP equipment is not necessarily required to output position, velocity, time, or any of the associated performance metrics. Comments on the document are due in mid-September for the SC181 plenary scheduled for the end of September.

- [AI 7-8] Tom Foster will submit a letter stating WG6's position that the following should be required outputs: position, velocity, EPU, position accuracy, containment radius, time of applicability/latency.

14. Review Backward Compatibility White Paper – 242A-WP-7-06

- This working paper was not yet completed, so this agenda item was tabled until the September WG6 meeting

15. Review of other Issue Papers
    - IP01: Turn Indication
        - [AI 7-14] Stuart will determine what changes are needed for removal of Turn Indication as a required SV element.
    - IP02: Altitude Rate Requirements {AI 6-13, AI 6-19} – 242A-WP-7-11 & 242A-WP-7-12
        - After a review of the working papers it was agreed that the text changes for 2.1.2.2.2.2 "Altitude Rate" in 242A-WP-7-11 and the supporting Appendix defining a simple Kalman filter for smoothing Barometric Altitude proposed in 242A-WP-7-12 were an acceptable resolution for IP02. The text changes and new Appendix will therefore be included in DO-242A and will close IP02.
        - [AI 7-6] Jonathan Hammer will incorporate into Appendix J the supporting study on altitude rate that demonstrated that geometric was the best altitude source followed by barometric, and then derived barometric.
    - IP03: Reporting Rates
        - This Issue Paper was deemed closed because it was overcome by events with the acceptance of IP46 and its resolution. (*See item #11 of these minutes.*)
    - IP05: Anonymity Requirements {AI 6-11, AI 6-12} – 242A-WP-7-09
        - Chris Moody and Bill Flathers felt that anonymous call signs did not need to be broadcast at all. Rather than having "VFR" displayed on a CDTI, a blank data block would equally signify a plane operating in anonymous mode.
        - 2.1.2.1.4.1 Anonymous Call Sign: Needs to be reworked saying that when in anonymous mode, a call sign must still be broadcast with a note suggesting either blanks or all digits could be used for the 3 character prefix.
        - 2.1.2.1.2 It was proposed that this section be broken into two sub sections for address (24 bit) and address qualifier (bits not specified) which will identify the address as ICAO, anonymous, TIS-B, etc.
        - [AI 7-13] Stuart will attempt to rework 242A-WP-6-02 per WG6's discussion on this Issue Paper.
    - IP06: Additional Aircraft/Vehicle Categories {AI 5-15} – 242A-WP-7-10
        - After reviewing 242A-WP-7-10 and Section 2.1.2.1.3 "Category", WG6 agreed to replace "Fixed Ground or tethered obstruction" with the following three new categories: fixed or movable point obstacle, fixed or movable cluster obstacle, fixed or barrier point obstacle. Also, the number list will become a bulleted list and the "reserved"'s will be removed.
        - The above changes will close IP06.
    - IP12: TCAS RA Information

- It was agreed to have an on-condition report to transmit the fact that an aircraft currently is experiencing an ACAS II RA. It was further agreed that update rates for this report will be left TBD in DO-242A.

- IP13: Surface Transmission Rates {AI 5-17} – 242A-WP-7-13
  - The paper proposed that the high update rate always be used to assure timely alerting for runway incursion alerting.
  - This Issue Paper was in direct response to DO-260. It was WG3's position that if an aircraft is stationary on the ground, its position report does not change, and therefore does not need to be updated at the specified rates of the MASPS. This was done to alleviate spectrum concerns and TCAS performance (due to interference limiting) over airports.
  - [AI 7-9] Carl Evers and Rick Cassell will examine the MASPS and propose specific changes to clarify the MASPS requirements for surface position update rates.

- IP19: Runway Incursion Alerting – 242A-WP-7-14
  - It was stated that IP19 needs some re-wording to properly reflect the broader context of runway incursion alerting mechanisms it has evolved into. This issue paper would then be deferred to a future revision of the MASPS.
  - Bill Flathers, while supporting Incursion Alerting, warned that to depend too much on automation in this realm could bring an environment that would have enough false alarms to do more harm than good.

- IP29: Requirements for Geometric Altitude in SV reports {AI 6-18}
  - This IP was rejected after the group considered Issue Paper 42. Action Item 7-11 will tighten the language as to what is meant by "when available" for altitude sources.

- IP30: Clarifications of Definitions of ADS-B {AI 5-3}

- IP32: Capability Code Definitions {AI 5-20}
  - Discussed Gary Livack's proposal of incorporating permissible applications/services. The group agreed that this was beyond what will be addressed for capability codes in DO-242A.
  - It was agreed that Capability Codes would represent equipment capability and not aircraft and/or flight crew capabilities.

- IP38: Helicopters on ground/hovering determination
  - This Issue Paper will be renamed Determination of Air/Ground State.
  - Action Item 7-16 might affect this IP.

- IP39: Vertical Integrity Bit

16. Review and Status of New Issue Papers

- IP41: Emergency Locator Transmitter Functionality [B. Flathers]
  - This paper was reviewed and it was agreed that the minimum change to the MASPS of defining one of the "spare" Emergency/Priority Status messages in 2.1.2.3.1 for a crash situation. Another possible MASPS change would be to add some words to Appendix E that an ELT is a potential function supported by ADS-B. This issue paper was accepted and will be addressed in DO-242A [AI 7-10] Bill Flathers will propose a label for an Emergency/Priority Status, and some new text for Appendix E.

- IP42: Altitude Encoder and Altimetry Self-test Feature [B. Flathers]

> ➢ Originally, this Issue Paper was withdrawn since it was determined as out of scope of ADS-B. It was viewed that these capabilities might by a ground-based service using ADS-B broadcasts, but would not need any change to the current ADS-B requirements. [AI 7-11] However, it was then agreed that wording will be tightened in the State Vector requirements that both barometric and geometric altitude shall be reported when available.

- IP43: Need for "Aircraft Address" on Dense Environments [B. Flathers]
  > ➢ After some discussion this Issue Paper was withdrawn because it was determined that there was no measurable benefit in bandwidth. [AI 7-12] Bill Flathers will submit an addendum to this Issue Paper discussing the reason for withdrawal.
- IP44: Data Source Appendix [T. Warren]
- IP45: Short-term Intent Parameters [R. Barhydt]
- IP46: Reflect range dependency of requirements in Tables 3-3 and 3-4 [J. Hammer]
  > ➢ *See item #11 of these minutes.*
- IP47: Include approach spacing intent example in Appendix M [J. Hammer]
- Passive Ranging Issues [J. Maynard] {AI 5-1}
- Share Link Service Protections [T. Foster] {AI 2-15}

17. Issue Paper Status Review

- The current schedule was reviewed and it was agreed that the delivery on DO-242A would need to slip one plenary cycle. This means the following:
  - o that DO-242A will be balloted for the April plenary;
  - o The final draft must be presented to RTCA by the end of February;
  - o WG6 will attempt to have a first complete draft for internal review by January 11, 2002.

18. Upcoming Meetings
- September 25-27, Trios Associates, Washington D.C.
- October 23-26, Washington D.C. area. (Arlington??)
- December 10-14, Washington D.C. area (RTCA??)
- January 28-31, Washington D.C. area

19. Action Items

Action Number	Action Item Description	Assigned to	Status
7-1	Consider from an operational point of view whether a change in value which improves NIC or NAC needs to be updated at the same rate as the state vector just like a detrimental change does, or if it can be update at the lower update rate of the Mode Status report.	Jonathan Hammer	
7-2	Formally forward 242A-WP-7-16 to WG4 for consideration in their ASA MASPS work, and inform Pierre and Jean-Claude Richard of our review and actions of their submitted comments.	Tom Foster	Completed (9/7/01 email)
7-3	Update draft of the MASPS language for re-organization of the SV and MS reports (242A-WP-6-11A) and distribute it to WG6 prior to the September meeting.	Jim Maynard	
7-4	Inform Steve Heppe of the agreed upon resolution of IP46 and it's impact on closing of IP03	Stuart Searight	Completed (9/7/01 email)
7-5	Confer with Steve Heppe, Stan Jones, and Bill Harman and attempt to resolve IP35 to everyone's satisfaction.	Jonathan Hammer	
7-6	Incorporate into Appendix J the supporting study on altitude rate that demonstrated that geometric was the best altitude source followed by barometric, and then derived barometric.	Jonathan Hammer	
7-7	Develop changes to Section 3.3.2, and Tables 3-3(a)&(b) addressing what messages each equipage class will be required to broadcast.	Jim Maynard	
7-8	Write letter stating WG6 concerns with RNP MOPS and submit it to SC181.	Tom Foster	
7-9	Examine the MASPS and propose specific changes to clarify the MASPS requirements for surface position update rates to resolve IP13.	Carl Evers Rick Cassell	
7-10	Propose a label for an Emergency/Priority Status, and some new text for Appendix E to handle crash situations and Emergency Locator Transmitter functions. (IP41)	Bill Flathers	
7-11	Tighten the wording in the State Vector requirements, that both barometric and geometric altitude shall be reported when available, and clarify what is meant by "when available". (IP42)	Jim Maynard	
7-12	Submit an addendum to IP43 discussion reasons why it was withdrawn.	Bill Flathers	
7-13	Rework 242A-WP-6-02 per WG6's discussion at their August meeting on this Issue Paper	Stuart Searight	
7-14	Determine what changes are needed for removal of Turn Indication as a required SV element	Stuart Searight	
7-15	Implement proposed changes for IP 36	Stuart Searight	
7-16	Propose language that will define when an aircraft is considered on the ground and when it is airborne and the transitions in-between these states and propose what needs to be broadcast dependant on these states..	Ken Staub Bill Flathers	
7-17	Reword Issue Paper 19 to reflect the broader context of runway incursion alerting this paper now represents.	????	
6-1	Draft letter to SC-181 asking if accuracy fields can be output on an avionics bus so that they can be used by ADS-B and if DO-229A GPS receiver's outputs (HFOM, VFOM, HPL) satisfy the requirements of DO-236A. (This will also close AI's 3-1 & 4-6.)	Tony Warren	

Action Number	Action Item Description	Assigned to	Status
6-2	Do preliminary update of WG4 paper on NIC/NAC and distribute it to group.	Tony Warren	Completed
6-3	Propose specific MASPS changes for NIC/NAC based on tables and material in 242A-WP-6-03.	Jim Maynard	Completed (242A-WP-6-11A)
6-4	Search entire MASPS for instances of "NUC", "integrity", and "accuracy" to assure NIC/NAC changes are complete.	Stuart Searight	
6-5	Clarify Tables 2-2 and 2-3 and all text referencing these tables. (This material is not ADS-B requirements, but is rather "anticipated application requirements".)	Stuart Searight	
6-6	Update proposed specific MASPS language to address short-term intent information for the August WG6 meeting.	Richard Barhydt	Closed. (OBE)
6-7	Draft appendix that will address long-term intent and TCPs for the August meeting.	Tony Warren	Closed. (OBE)
6-8	Write specific MASPS changes for air-reference velocity vector and IP37.	Richard Barhydt	
6-9	Collect simulator data that will justify/support the MASPS IP37 changes.	Tony Warren	
6-10	Draft specific MASPS changes that addresses Aircraft size characteristic (IP04) and navigation reference point (IP14).	Ken Staub	
6-11	Clarify or change wording in proposed MASPS changes for IP05 so that anonymous addresses will be reset if duplicate addresses are detected.	Ron Jones	
6-12	Get approval for reserving suitable prefix to be used for anonymous call sign and address.	Ron Jones	
6-13	Characterize the Kalman Filter algorithm used in his conflict detection simulation, perform more analysis and coordinate a telecon for the 2nd week in August.	Jonathan Hammer	Completed. (242A-WP-7-12)
6-14	Distribute updated NIC/NAC white paper reflecting review at meeting #6 no later than Friday, July 27.	Tony Warren	Completed. (242A-WP-7-01)
6-15	Arrange telecon for Wednesday, August 1 from 1-3 EST to discuss the white paper update.	Tony Warren	Completed.
6-16	Develop and letters in response to both DO-229C and DO-253A stating the needs and concerns of the ADS-B community.	Tom Foster	Completed.
6-17	Propose specific language to replace the formula in note 7 of Table 3-4, and distribute it via email.	Steve Heppe	Completed. (242A-WP-7-05)
6-18	Review the proposed revision of Table 3-5 in 242A-WP-6-11 and determine if it adequately resolves IP29 on the reporting of both geometric and barometric pressure altitude.	Steve Heppe	
6-19	Propose specific changes to 2.1.2.2.2.2 to reflect discussions on IP02.	Jonathan Hammer	Completed. (242A-WP-7-13)
6-20	Update 242A-WP-6-11 to reflect WG6 walkthrough of initial draft of NIC/NAC/SIL and SV Report material	Jim Maynard	Completed. (7/24/01)
6-21	Examine to what accuracy does heading need to be recorded for aircraft on airport surface.	Ken Staub	
6-22	Verify the accuracy of Note #3 on page 8 of 242A-WP-6-11.	Tony Warren	
6-23	Author an Issue Paper requesting Table 3-4 be clarified by reorganizing it more by acquisition range than by applications.	Jonathan Hammer	Completed. (IP46)
5-1	Write an Issue Paper documenting the issues and concerns related to passive ranging. This Issue Paper will not be addressed in Rev A.	Jim Maynard	
5-2	Summarize our discussions on IP2 and propose alternate resolution for using "best source" for altitude rate.	Tony Warren	Closed. (242A-WP-5-09)

Action Number	Action Item Description	Assigned to	Status
5-3	Author a proposed footnote to the definition of ADS-B which talks to the link flexibility and protocol issues in response to the groups discussion on IP30.	Dan Castleberry	
5-4	Verify that the update to the formula in note 7 of Table 3-4 proposed in IP35 is consistent with the requirements defined in the table.	Jonathan Hammer	Closed. Superceded by agreed upon resolution to IP35 at July meeting.
5-5	Write an issue paper calling for an appendix describing the various data sources needed to support different levels of ADS-B functionality	Tony Warren	Completed. (IP44)
5-6	Develop possible straw-man resolutions for IP33	Richard Barhydt Jim Maynard Dan Castleberry	Partially addressed by 242A-WP-6-11
5-7	Formally pass on Issue Paper "New Livack 3" to WG4 for consideration and safety analysis.	Stuart Searight	
5-15	Propose any needed additional aircraft/vehicle categories listed in 2.1.2.1.3. (IP06)	Gary Livack	
5-17	Coordinate with SF-21 group to develop and present pertinent analysis on the necessary broadcast rates needed to support runway incursion. (IP13)	Gary Livack	Completed. (242A-WP-7-13)
5-20	Coordinate abut work being done to resolve IP23 and IP32 regarding a way to map ADS-B capabilities, applications, features, and intended functions to the draft Advisory Circular on Guidelines to the Operational Approval for ADS-B Avionics.	Gary Livack Jim Maynard	
5-21	Notify John Gonda and Pedro Rivas of the agreed upon deferral of IP25.	Tom Foster	
2-15	Produce IP on protecting ADS-B services from other services provided by a shared data link	Tom Foster	
2-16	Write ad hoc group's response to issue #3 of IP7 that will put issue in broader context and serve as proposal to WG#4 for consideration in the ASA MASPS.	Dan Castleberry	
3-1	Formulate proposed requests of SC-181 regarding placing requirements on DO-236 (RNP) to provide inputs for ADS-B as it relates to NIC/NAC.	Tony Warren	
3-6	Write White Paper on backward compatibility subject	Tom Foster	
3-9	Write comments to IP15 explaining rationale for rejecting	Dan Castleberry	
4-4	Write a note for Table 2-1a and 2-1b to address the independence of the accuracy and integrity values and to clarify the reference to DO-236A	Tony Warren	
4-6	Consult with Boeing navigation experts to obtain inputs on the MASPS definitions of navigation containment and integrity for consistency with RNP and GNSS standards	Tony Warren	
4-7	Provide IP on proposal for ADS-B requirements to address formation flight characteristics	John Gonda	Also see AI 5-21